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THE PLACE THE SUBJECT OF FORESTRY SHOULD OCCUPY IN HIGH SCHOOL INSTRUCTION

DURING the winter which has just passed I delivered a lecture for Dr. Charles DeGarmo, of Cornell University, on the place forestry should occupy in high-school instruction. The class consisted mainly of teachers, and the course, of which the lecture above referred to was only a very small part, consisted of lectures by various educators on high-school instruction.

At first thought the majority of well informed individuals would say that forestry deserves no place in the already overcrowded curriculum of the high school. After I had made my position clear the opinion of the class seemed unanimous that some forestry, at least, should be taught in connection with, or as a part of, geography in high schools. A few at first argued with reason that if forestry should be taught, agriculture and a host of other subjects deserve a place. These persons, however, failed to realize the important rôle which the forest plays as a geographical agent in checking the destructive forces of nature, modifying the nature of the earth, and in molding the nature of the occupations of its people.

Forestry may be classed in two ways—first as a profession and second as a subject of general interest about which every well informed citizen should know something. In the first case the nature of the instruction should be detailed and technical and should cover a period of at least four years. This sort of instruction belongs to schools of forestry and agricultural colleges. There are already two schools of forestry in this country—one at Cornell and the other at Yale University. There are many such institutions in Europe. It is to these schools where a student must go in order to become a professional forester. It is in such institutions that a student is taught how to properly form, tend, and utilize a forest. In addition to learning how to care for forests, he learns also how to survey, construct wagon

roads and logging railroads, operate saw mills, etc. He is, in other words, a forest engineer.

In the second case, for the acquisition of knowledge of a general nature relating to the forest which every man and woman should know, the high school is the place. All are agreed that in case it should be taught at all it does not belong below the upper grades of the high school. It is also so that a very large proportion of our high-school graduates would never acquire such a knowledge unless they get it in the high school, because many of our high-school graduates never go to colleges and universities and because many of our colleges and universities do not offer instruction in many of the most important subjects. There is no subject, for instance, of more general interest and of more importance than ethnology, yet how few even of our great universities offer instruction in this subject and how few of their graduates know even the names, to say nothing of the natures, of the peoples who once inhabited America.

It is not my intention to suggest the addition of another subject to the high-school curriculum. It should be given, however, the place in physical and commercial geography to which its importance entitles it. It is very easy for a man to exaggerate the importance of his specialty. Few doubt, however, the importance of forests. As compared with Europe, general information on the subject is woefully lacking throughout this country. Very few know the meaning of forestry. Arbor Day celebrations have done much to stimulate an appreciation of trees but these celebrations are often farcical, if not misleading, in nature. A song is sung, poetry recited, and then a few trees, often only one, are carelessly stuck in the ground, often in the very place which should be left open. A very small proportion of these trees live, however. "O, Woodman, Spare that Tree" is sung. A forester never hesitates to cut a tree if it is ready to cut, but he always plants more and plants them well. Aside from this question of Arbor Day, an institution which has been adopted in many parts of the world and which will do lasting good if properly conducted, why should forestry be taught in high schools? First of all, every great movement in this country

must have popular support back of it. Our people must be educated to a point where they will know the advantages of a forest cover and the meaning of forestry. When this occurs the future of forestry is assured. The main cause of reckless, wasteful forest destruction in this country is ignorance. It is certainly one of the functions of the public school to overcome this difficulty. It is not necessary to introduce forestry into the public schools of Germany because forestry is born and bred into the body of every German. The proper care of forests is there a matter of course. Secondly, why does it deserve a place in high-school instruction in connection with geography?

I can only mention, in passing, the importance of the commercial side of the question. Think of the great lumber industries of the North, South, and far West, of the hundreds of thousands of railroad ties, telegraph poles, and bridge pilings, of the immense amount of wood used in construction for houses and fences and the hundreds of industries which make use of it. Think of the rubber forests of the tropics, the naval stores industry of our South and maple sugar of the North. Think of cork, camphor, rubber, wax, dyes, medicines, and a host of products yielded by the forest in various parts of the world. The young man about to enter business should, in fact must, know something of these products. It is of interest to note in this connection that two mahogany logs sold for \$5200 in Liverpool last year. These logs came from Africa, and were purchased by an American.

It is not, however, on this side of the subject that I lay special stress. Although this is a part of commercial geography and although every young business American is eager to learn of the products, industries, and occupations of every country, the side of the subject which relates to the influence of the forest in molding and beautifying the earth is of much more importance and much more in place in the geography of the common high school.

There is too little space for me to define it except in a general way.

1. The forest is a soil former. Vast areas of swamp lands

consist of the black decayed remains of the forest. One tree in the tropics called the mangrove grows in salt water on the edge of coral islands. So much land is wrested from the ocean by its aggressive growth that it is often called the "landformer." The same is so of the willow, that Cinderella of trees, in northern latitudes. Trees cause the disintegration of rocks. The acid produced in the decomposition of organic matter causes the rock to crumble into soil. The tips of roots dissolve their way through soluble rock. In coral islands large trees may be seen growing out of the solid rock.

2. The forest is a soil improver. A virgin soil is a soil rich in leaf mold. The roots of trees penetrate to the deep layers of the soil and secure rich mineral matter, which is deposited on the surface with organic matter in the form of leaves and sticks. The only way to bring virginity back to a worn-out soil is to grow a forest on it.

3. The forest is a soil fixer. Erosion is the wearing away of rocks and soil by wind and water. Shifting dunes, sandstorms, landslides, and avalanches are prevented by a forest cover. The mass of roots holds the soil in place. Many countries have been rendered inhabitable by the planting of trees. Whole villages have been destroyed in Europe by landslides and shifting sands. This has been prevented by forest planting.

4. The forest is a flood preventer. The flow of water is retarded by the roots and litter of the forest floor. A flood to be conquered must be attacked in the hills of its source where its forces are scattered and easily controlled. The way to conquer it is through the agency of forest growth. The forest imparts a regularity to the flow, so that there is less high water in wet seasons and less low water in dry seasons. This means much to industrial establishments along the banks of a stream depending upon its flow for power. Snow melts slowly in the shade of the forest.

5. The forest is a windbreak. Nothing is more destructive than a hot dry wind. It blasts and levels crops. It parches the ground. Nothing is more wearisome to man and beast. Nothing is more grateful than the shelter of a belt of trees.

6. The forest beautifies the earth. The ideal country is the one in which there is proper mingling of forests and fields—forests in the mountains and fields in the valleys. A treeless country is distressing and monotonous.

7. The forest is a sanitary agency. Malaria follows in the wake of forest destruction. The purity of forest air is proverbial. It is a resting-place for busy brains. It is the source of good, pure water for many large cities. The war department is planting Eucalyptus trees in Havana province to prevent malaria and yellow fever. This has been done elsewhere with considerable success, especially in Italy and Algeria. The Landes of France was once a pestilential swamp. Since the planting of pine trees it has developed into a health resort. A forest occupation is healthy. It produces strong, broad-chested men. Would that a large number of our population could find employment in the forest.

Another branch of the subject which is of interest from a geographical standpoint is the geographical distribution of forests over the face of the earth—why are there forests in one place and deserts and plains in another? What are the forces which cause the spread of forests and what are the barriers which prevent or restrict their growth? There are many aids to forest extension, such as winds, currents of water, animals, and man. There are many barriers which restrict their growth, such as cold, drought, unsuitable soil, strong winds, animals, and fire.

There is still another phase of the subject which is of importance to the geographical student. Every American should have some knowledge of our great forest reservations and national parks.

These reservations have been set aside for the preservation of the timber and natural curiosities and extraordinary scenery, and for the conservation of moisture, since in many western districts agriculture is impossible without water for irrigation. These reservations cover an area of almost 50,000,000 acres, a territory so large and varied that it is worthy some space in even primary geographies. There are 640 acres to the square

mile—there would be then 78,125 square miles in these reservations. They cover an area much larger than the whole of New England states, three times as large as Greece, and almost five times as large as Switzerland.

The establishment of these reservations has apparently only just begun. A great park in the Appalachian Mountains and another at the head waters of the Mississippi in Minnesota will be in time established.

Already the State of New York owns a vast tract of land in the Adirondacks, and more is being purchased, for the preservation of the forests and game.

Under the circumstances, few can doubt that the subject is worthy a large place in our secondary schools and in the minds of our people.

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